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MAINE AGRICULTURAL EXPERIMENT STATION.

BULLETIN No. 17.

SECOND SERIES.

IMPORTANT FACTS ABOUT CORN.

Bulletin No. 11 of this Station treats of the relative yield of mature Maine Field Corn and immature Southern Corn.

The data collected during a study of this matter show certain allied facts that are of much importance to the farmer who is planning to produce corn the coming season as a fodder or silage crop.

COMPOSITION OF MATURE MAINE FIELD CORN AND IMMATURE SOUTHERN CORN.

Analyses of the experimental crops of corn on the College farm reveal the composition displayed below.

Crops of 1892 and 1893, average.	In 100 lbs. Green Corn.						
	Water.	Dry Substance.	Ash.	Protein Nx6.25.	Fiber.	Nitrogen free extract.	Fat.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Southern Corn, immature.....	84.80	15.20	1.18	1.78	4.20	7.70	.34
Maine Field Corn, mature.....	78.91	21.09	1.28	2.28	4.15	12.77	.61
Excess in Field Corn	—	5.89	.10	.50	— .05	5.07	.27

It appears from these averages that under the conditions existing in Maine, which require the cutting of the large varieties of corn in an immature state, the Maine field corn which reaches maturity, contains the larger percentage of dry matter. Again, the excess of dry matter in the Maine field corn consists almost wholly of the non-nitrogenous compounds classed under the head of nitrogen-free-extract.

The Maine Field Corn is in this case worth forty per cent. more than the immature Southern Corn, pound for pound, judging simply by the per cent. of dry matter. The great bulk of the Southern Corn fodder is not a proof of greater or even of equal value.

THE EFFECTS OF MATURITY UPON THE MAINE FIELD CORN IN COMPOSITION AND YIELD.

Composition: In order to obtain testimony on this point, in 1893 a field of Maine corn was cut in five different lots, ranging in times of cutting from August 15th to September 21st, and in stage of growth from the early formation of the ear to full maturity. The analyses of samples from these different cuttings appear below.

	In 100 lbs. Green Corn.						
	Water.	Dry Substance.	Ash.	Protein N x 6.25.	Fiber.	Nitrogen free extract.	Fat.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Maine Field Corn, cut Aug. 15...	88.29	11.71	1.09	1.75	3.10	5.46	.30
Aug. 28...	82.50	17.50	1.14	2.05	4.08	9.71	.52
Sept. 4....	80.45	19.55	1.21	2.22	3.85	11.68	.59
Sept. 12...	76.83	23.17	1.29	2.22	4.48	14.50	.68
Sept. 21...	74.66	25.34	1.50	2.34	4.71	16.04	.75

The immature and mature corn differ in the following essential particular:

The mature corn is less watery; i. e. it contains a much larger percentage of dry substance. During the thirty days before the mature crop was harvested there was a continuous and large increase in the percentage of dry matter. It will appear later that this was mostly due to an actual growth of dry matter, rather than to a drying out of water.

Yield: The field of corn selected for studying the influence of maturity upon the yield was of very uniform growth, being finely eared and in every way satisfactory for experimental purposes.

Each of the ten plots consisted of five rows, and it was decided to harvest one-fifth of the crop or one-tenth of an acre at each of five periods of growth, cutting one row of each plot at each period.

Date of cutting and condition of crop.	Days in each period of growth.	Yield per acre.		Gain in weight in each period, dry matter—lbs.	Rate of gain per day, dry matter—lbs.
		Green Corn.	Dry substance.		
Aug. 15, ears beginning to form.....		lbs. 26,166	lbs. 3,064.0		
Aug. 28, a few roasting ears	13	29,777	5,210.9	2146.9	165.0
Sept. 4, all roasting ears.....	7	31,000	6,060.5	849.6	121.3
Sept. 12, some ears glazing.....	8	28,833	6,680.6	620.1	77.5
Sept. 21, all ears glazed	9	27,777	7,039.7	358.1	39.8
Increase dry matter after Aug. 15.....				3974.7	

The results of this experiment certainly furnish a striking illustration of the folly of harvesting immature corn for silage or fodder purposes whenever it is possible to allow it to attain maturity.

In this instance, *the total quantity of dry matter in an acre of the corn at maturity was nearly two and one-half times greater than at the silking period thirty-seven days previous*, the average rate of increase of dry substance per acre being about 108 pounds daily. This daily increase is equivalent in quantity to one day's ration for four or five cows of ordinary weight.

THE INFLUENCE OF MATURITY UPON THE QUALITY OF THE DRY MATTER IN THE CORN PLANT.

It is well known that the portion of the plant known as nitrogen-free extract is a mixture of substances such as sugar, starch, gums, waxes, etc., some of which have a higher value than others for use by the animal. In short, the larger the proportion of starch and sugars in the nitrogen-free-extract of a food, the more highly do we estimate the nutritive worth of that food. For this reason a higher value is placed upon the nitrogen-free-extract of the grains than upon that of the coarse fodders.

It is evident then, that if allowing the corn plant to mature increases the relative proportion of sugars and starch in dry matter, we have not only the advantage of obtaining a larger yield of dry matter but we secure material of better quality for food purposes. The figures show the facts as obtained from a single investigation.

	Proportion of starch and sugars in nitrogen-free extract.	Pounds of starch and sugars yielded per acre.
Aug. 15, ears beginning to form.....	25.1%*	358.5 lbs.*
Aug. 28, a few roasting ears.....	40.5%	1172. lbs.
Sept. 4, all roasting stage.....	42.7%	1545. lbs.
Sept. 12, some ears glazing.....	42.2%	1764. lbs.
Sept. 21, all ears glazed.....	50.3%	2244. lbs.

It appears from the figures that not only is there a constant and large growth of starch and sugars up to the condition of maturity of the corn plant, *but these valuable compounds increase more rapidly than certain less important constituents, so that the mature plant substance is of better quality than at any previous stage of growth.*

SUMMARY.

(1.) Under the conditions existing in Maine the varieties of Flint Corn which mature in the state furnish fodder or silage material much more valuable, pound for pound of fresh weight, than it is possible to secure with the larger varieties of Dent Corn which do not mature.

(2.) The Flint varieties of corn should always be allowed to mature, as there is a large and continuous production of plant substance up to the period of full maturity. Harvesting half grown or immature corn is a wasteful practice.

(3.) Owing to the relatively large production of sugars and starch in the late stages of growth, a pound of the dry substance of the mature well-eared corn plant possesses a higher nutritive value than at any earlier stage of growth.

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MAINE STATE COLLEGE, }
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* Probably somewhat too low.